

INTRODUCTION

If you are reading this Introduction, you belong to the generation that will manage high-level nuclear waste, that is, spent fuel and reprocessed waste resulting from operation of commercial nuclear generating plants. The modern world relies heavily on energy and especially electricity to maintain its lifestyle. In our Nation more than 20% of our electricity currently comes from nuclear powerplants, a contribution which is second only to coal. Therefore, it is crucial that today's students understand what this waste is, where it comes from, and how it can be disposed of safely. While an older generation is now planning for disposal of high-level nuclear waste, people your age will be our Nation's voters and workers when the plans being made now become reality. You will need to be able to make informed decisions about nuclear waste issues.

Scientific Truth

In making these decisions, it will be important to have an understanding of scientific truth and scientific inquiry. Scientific inquiry presumes that natural events occur in such consistent ways that careful and systematic study can reveal their cause and results.

Just as a detective examines clues at the scene of a crime in the hope of identifying the criminal, a scientist examines the results of a natural process to better understand the process. In this way, scientists seek to produce true knowledge. But they are the first to point out that what science achieves is not to be

considered true **absolutely** or beyond change.

The history of science demonstrates this. For example, people living in Europe once thought the world was flat. Christopher Columbus dispelled that theory during his voyage of discovery. Not that long ago, scientists thought the atom could not be split. We now know that it can be.

What is considered to be true at one time may later be found to be only partially true—or in some cases, untrue. New data may also provide more evidence that supports or reinforces current understanding.

At any given time, decisions that rely on scientific data must be based on the best understanding of the meaning of the data at that time. We may say, then, that **scientific truth is true insofar as we are capable of knowing it at the time and under the circumstances surrounding the scientific inquiry.**

Individual fields of scientific research seem to go through cycles of activity. Major discoveries or advances are usually separated by periods when the results are discussed, added to, and shaped into a new and improved understanding. The new understanding includes much of the previous understanding, but often major parts of the previous understanding must be discarded.

Honest disagreements as to the correct interpretation of new data are common among scientists. This is especially true in the early stages of information gathering. To achieve scientific understanding, it is necessary that

free and open discussions take place and that opposing views are fairly evaluated.

Geologic Disposal of Nuclear Waste

Nuclear waste is an unavoidable byproduct of our Nation's many research, medical, defense, and energy-producing activities that involve the use of radioactive materials.

After years of study, scientists throughout the world agree that geologic disposal is the most desirable, safest, and most acceptable way of permanently disposing of high-level radioactive waste.

The U.S. is seeking to establish a national geologic repository. Similar geologic waste disposal programs are also underway in Belgium, Canada, Finland, France, Germany, Japan, the Netherlands, Spain, Sweden, Switzerland, and the United Kingdom. Since 1992, programs have also been considered in Argentina, India, and Italy.